

Assessment of CPTI surface properties after nitrogen ion implantation with various doses and energies

Abstract

Nitrogen ion implantation is one of the surface modification techniques used for increasing corrosion resistance of commercially pure titanium (CpTi). The nitrogen ion implanted CpTi in various doses markedly changes the corrosion resistance. Still the effect of nitrogen ion implantation on the CpTi at different energies needs to be verified. This study uses different methods to assess the CpTi surface properties after nitrogen ion implantation in various doses and energy. Surface hardness of the CpTi increases with an increase of the dose and decreases with an increase of the energy. The precipitation of the TiN increases with an increase of the nitrogen dose, and no formation of the Ti₂N phase clearly appears. Corrosion resistance of the CpTi specimens can be upgraded to some extent after their surfaces are modified, implanting nitrogen ions at 100 keV by increasing dose. The optimum surface properties of the implanted CpTi are analyzed to contribute to materials science technology.